

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A substrate, at least one part of the surface of which has been rendered hydrophobic, having for this purpose a hydrophobic surface structure comprising an essentially mineral silicon-containing sublayer and an outer layer of hydrophobic agent grafted onto said sublayer, ~~characterized in that~~ wherein said sublayer has received the outer layer of hydrophobic agent, said sublayer having ~~although it had~~ a surface that was in an activated state before being brought into contact with said hydrophobic agent.

Claim 2 (Currently Amended): The substrate as claimed in claim 1, ~~characterized in that~~ wherein the sublayer is a hard sublayer.

Claim 3 (Currently Amended): The substrate as claimed in ~~either of claims 1 and 2,~~ ~~characterized in that~~ claim 1, wherein it is formed by a plate, whether plane or with curved faces, of monolithic or laminated glass, of glass-ceramic or of a hard thermoplastic, such as polycarbonate.

Claim 4 (Currently Amended): The substrate as claimed in claim 3, ~~characterized in that~~ wherein the sublayer of the hydrophobic coating forms part of the substrate, the latter being formed by a plate, whether plane or with curved faces, of monolithic or laminated glass or of glass-ceramic, the composition of which, at least on the surface, corresponds to that of the essentially mineral silicon-containing sublayer.

Claim 5 (Currently Amended): The substrate as claimed in claim 4, ~~characterized in that~~ wherein the substrate is a glass dealkalized at least on its surface.

Claim 6 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 5,~~
~~characterized in that~~ Claim 1, wherein said sublayer is formed by a compound chosen from
SiO_x, where $x \leq 2$, SiOC, SiON, SiOCN and Si₃N₄, it being possible for hydrogen to be
combined in all proportions with SiO_x, where $x \leq 2$, SiOC, SiON and SiOCN.

Claim 7 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 6,~~
~~characterized in that~~ claim 1, wherein the silicon-containing sublayer contains aluminum, in
particular up to 8% by weight, or carbon, Ti, Zr, Zn and B.

Claim 8 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 7,~~
~~characterized in that~~ claim 1, wherein the silicon-containing sublayer when its surface is in
the activated state has a thickness of between 20 nm and 250 nm, especially between 30 nm
and 100 nm and in particular between 30 nm and 75 nm.

Claim 9 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 8,~~
~~characterized in that~~ claim 1, wherein the silicon-containing sublayer has, when its surface is
in the activated state, an RMS roughness of between 0.1 nm and 40 nm, in particular between
a few nm and 30 nm.

Claim 10 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 9,~~
~~characterized in that~~ claim 1, wherein the silicon-containing sublayer when its surface is in
the activated state has an actual developed area at least 40% greater than the initial plane area.

Claim 11 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 10,~~
~~characterized in that~~ claim 1, wherein the silicon-containing sublayer when its surface is in
the activated state has a hardness such that it does not delaminate after 100 revolutions, and
preferably up to 200 revolutions, in the Taber test.

Claim 12 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 11,~~
~~characterized in that~~ claim 1, wherein the outer layer of hydrophobic agent is based on a
hydrophobic agent chosen from:

- (a) alkylsilanes of formula (I):



in which:

[[-]] n ranges from 0 to 30, more particularly from 0 to 18;

[[-]] m = 0, 1, 2 or 3;

[[-]] R represents an optionally functionalized organic chain; and

[[-]] X represents a hydrolyzable residue, such as an OR^0 residue, where R^0
represents hydrogen; or a linear, branched or cyclic, especially C_1 - C_8 , alkyl residue;
or an aryl residue; or such as a halo, for example chloro, residue;

- (b) compounds with grafted silicone chains;

- (c) fluorosilanes, such as those of formula (II):



in which:

[[-]] R^1 represents an especially C_1 - C_9 monofluoroalkyl, oligofluoroalkyl or
perfluoroalkyl residue; or a monoaryl, oligoaryl or perfluoroaryl residue;

[[-]] A represents a hydrocarbon chain, optionally interrupted by a heteroatom such
as O or S;

[[-]] R^2 represents a linear, branched or cyclic, especially C_1 - C_8 , alkyl residue, or an aryl residue; X represents a hydrolyzable residue, such as an OR^3 residue, where R^3 represents hydrogen or a linear, branched or cyclic, especially C_1 - C_8 , alkyl residue; or an aryl residue; or such as a halo, for example chloro, residue; and

[[-]] $p = 0, 1$ or 2 .

Claim 13 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 12,~~ ~~characterized in that~~ claim 1, wherein the layer of hydrophobic agent has a thickness of between 1 and 100 nm, preferably between 2 and 50 nm.

Claim 14 (Currently Amended): The substrate as claimed in ~~one of claims 1 to 13,~~ ~~characterized in that~~ claim 1, wherein the layer of hydrophobic agent has a weight per unit area of grafted fluorine of between $0.1 \mu\text{g}/\text{cm}^2$ and $3.5 \mu\text{g}/\text{cm}^2$.

Claim 15 (Currently Amended): A process for manufacturing a substrate as defined in ~~one of claims 1 to 14, characterized in that~~ claim 1 comprising depositing a coating layer of hydrophobic agent ~~is deposited~~, in at least one pass, on the surface of a silicon-containing mineral layer formed at least partly on the surface of the substrate, said deposition of the hydrophobic agent taking place while said surface is in the activated state.

Claim 16 (Currently Amended): The process as claimed in claim 15, ~~characterized in that~~ wherein an activated surface of the silicon-containing mineral layer is obtained by depositing it under conditions in which its surface is obtained directly in the activated state.

Claim 17 (Currently Amended): The process as claimed in claim 15, ~~characterized in that~~ wherein an activated surface of the silicon-containing mineral layer is obtained by carrying out an activation treatment in at least one pass.

Claim 18 (Currently Amended): The process as claimed in ~~one of claims 15 to 17,~~ ~~characterized in that~~ claim 15, wherein the hydrophobic agent is deposited within the shortest possible time, preferably between 1 second and 15 minutes, after the activated surface has been obtained.

Claim 19 (Currently Amended): The process as claimed in ~~either of claims 17 and 18, characterized in that~~ claim 17, wherein an activation treatment is carried out under conditions that do not go as far as etching, by the use of a plasma or an ionized gas, at reduced or atmospheric pressure, chosen from air, oxygen, nitrogen, argon, hydrogen, ammonia and mixtures thereof, or by the use of an ion beam.

Claim 20 (Currently Amended): The process as claimed in ~~either of claims 17 and 18, characterized in that~~ claim 17, wherein an activation treatment is carried out under conditions that allow a silicon-containing layer to be etched, by the use of a plasma of at least one fluorine-containing gas chosen from SF₆, CF₄, C₂F₆ and other fluorinated gases, where appropriate combined with oxygen, it being possible for the oxygen to represent up to 50% by volume of the etching plasma.

Claim 21 (Currently Amended): The process as claimed in claim 20, ~~characterized in that~~ wherein the activation carried out under conditions that allow the silicon-containing layer

to be etched by an activation treatment, which does not cause additional etching but does still modify the chemical nature and/or the electrostatic state of said layer, is monitored.

Claim 22 (Currently Amended): The process as claimed in ~~one of claims 15 to 21,~~ ~~characterized in that~~ claim 15, wherein the silicon-containing layer is deposited, cold, on the substrate by vacuum cathode sputtering, preferably magnetron sputtering and/or ion beam sputtering, or by low-pressure or atmospheric-pressure PECVD (plasma-enhanced chemical vapor deposition), or else deposited hot by pyrolysis.

Claim 23 (Currently Amended): The process as claimed in claim 22, ~~characterized in that~~ wherein a layer of SiO₂ is deposited, as silicon-containing layer, by PECVD, using a mixture of an organic or nonorganic, silicon-containing precursor, such as SiH₄, hexamethyldisiloxane, tetraethoxysilane and tetramethyldisiloxane, and an oxidizer, the subsequent activation being carried out in the same chamber or in a separate chamber.

Claim 24 (Currently Amended): The process as claimed in ~~one of claims 15 to 23,~~ ~~characterized in that~~ claim 15, wherein the fluorosilane layer is deposited by wiping-on, evaporation or spraying of a solution containing the fluorosilane, or by dipping, spin-coating, flow-coating, etc., using a solution containing the fluorosilane.

Claim 25 (Currently Amended): The process as claimed in ~~one of claims 15 to 24~~ claim 15 for the manufacture of glazing having a hydrophobic coating, ~~characterized in that~~ comprising depositing the sublayer ~~is deposited~~ on the glass on a glass manufacturing line using the “float” process while the glass is being supported by the bath of molten tin, or in a subsequent step, that is to say on leaving the bath of molten tin, in that the conversion

operations are then carried out, such as bending, toughening and/or assembling, especially by lamination, in order to obtain plates of glass made up from one or more sheets coated with the sublayer on at least one face, in that the sublayer or sublayers supported by said plates are then activated and in that, finally, a functionalization by the hydrophobic agent of the sublayer or sublayers thus activated is carried out.

Claim 26 (Currently Amended): The process as claimed in ~~one of claims 15 to 24~~ claim 15 for the manufacture of glazing having a hydrophobic coating, ~~characterized in that~~ wherein sheets of glass are manufactured by the float process, in that said glass sheets are then converted by operations such as bending, toughening and/or assembling, especially lamination, in order to obtain plates of glass made up from one or more sheets, in that the sublayer is then deposited on at least one face of the plates thus obtained, and in that the sublayer or sublayers are then activated, followed by the functionalization by the hydrophobic agent of the sublayer or sublayers thus activated.

Claim 27 (Currently Amended): The process as claimed in ~~one of claims 15 to 24~~, ~~characterized in that~~ claim 15, wherein the sublayer is deposited on at least one face of glass sheets obtained upon leaving the float process, in that these sheets thus coated with the sublayer or sublayers are converted, limiting the techniques used to those that do not damage said sublayer(s), and in that the sublayer or sublayers are then activated, followed by the functionalization by the hydrophobic agent of said sublayer or sublayers thus activated.

Claim 28 (Currently Amended): ~~Rain-repellent~~ A rain-repellent glazing comprising a substrate as defined in ~~one of claims 1 to 14 or manufactured by the process as defined in one of claims 15 to 27~~ claim 1.

Claim 29 (Currently Amended): ~~An application of the glazing as defined in claim 28~~
as A glazing for the automotive, aviation, building, electrical household appliance and
ophthalmic lens industries comprising the rain-repellent glazing of claim 28.